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The Scholastic Aptitude Test as a performance predictor of Broadened Opportunity for Officer Selection and Training (BOOST)

Belec, Marguerite E.

Monterey, California. Naval Postgraduate School

THE SCHOLASTIC APTITUDE TEST AS A PERFORMANCE PREDICTOR OF BROADENED OPPORTUNITY FOR OFFICER SELECTION AND TRAINING (BOOST)

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Dr. William E. Piland

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by

Marguerite E. Belec

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DEDICATION

To my Wonderful Husband

James Medric Belec

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I am grateful to the United States Navy for giving me the opportunity to study at San Diego State University. I am also grateful to Captain E.R. Ahlborn, Jr., Commanding Officer, Service School Command, Naval Training Center, San Diego, California, and to his staff, for their cooperation and support. Many thanks to Dr. Al Merino and Dr. William E. Piland. Most of all, I give thanks to my loving parents who have guided me on this journey of life.

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CHAPTER I

INTRODUCTION

A microcosm of society, the United States Navy seeks to commission minority officers reflective of society's composition. In recent years, the Navy has been unable to attain its accession goals for minority officers.

In recognition of the vast range of academic and cultural backgrounds of its applicants, the Chief of Naval Operations implemented the Broadened Opportunity for Officer Selection and Training (BOOST) program in 1969 as part of its Affirmative Action Plan. The program was designed to "ensure upward mobility opportunities are available to persons who have demonstrated qualities necessary for careers as unrestricted line officers, but whose past academic performance does not qualify them for immediate selection into an officer accession program." (OPNAV NOTICE 1500, 1988)

BOOST provides the opportunity "to acquire the scholastic skills and academic credentials" which may

eventually lead to commissioning. (BOOST Overview, 1988) Seventy per cent of students attending BOOST are minority.

According to the BOOST Student Information Guide, (Henderson, 1987), BOOST is, "an academic program which provides college preparatory instruction at the high school level," to upgrade the academic skills of the approximately 450 participants so they will be eligible for selection to established commissioning programs such as the Naval Academy or the Naval Reserve Officers Training Corps (NROTC).

Mathematics, physical sciences, and communication skills including reading, writing, listening, and speaking are emphasized. Buzby (1988) stated, "The BOOST curriculum encompasses three years of high school math, two years of high school science, and three to four years of high school English. The program is tough academically and militarily."

There are two tracks of study at BOOST (Mayhue, 1987). Track I consists of enlisted personnel who have served active duty time in the fleet, and were recommended on the basis of performance. Track I runs twelve months, from June until June the following year.

Track II consists of civilian personnel who were recruited into the Navy specifically to enroll in BOOST (Hahn, 1987). The eight week Basic Training program is the only active duty time the Track II students serve prior to enrollment in BOOST. Track II runs nine months, from September to the following June.

Female representation is limited to approximately ten per cent of class size due to the small number of NROTC scholarships available nationally to women.

The overall attrition rate averages 30% of the initial BOOST class size. Reasons for dropping out of the program vary from lack of personal motivation to being medically unqualified. The biggest factor, inhibiting BOOST selectees from successfully completing the program, is academic.

Personnel who are unable or unwilling to successfully complete BOOST, revert to active duty fleet status for three years to complete their enlistment obligation in accordance with the enlistment contract (Henderson, 1987).

Successful completion of BOOST consists of two requirements. First, the student must maintain a 2.5 average on a 4.0 scale in each subject. Remediation,

counseling, and academic review boards are provided to assist the student in attaining this goal. The second requirement is that the BOOST student must achieve a minimum SAT score of 950 (consisting of 500 in Math, and 450 in Verbal) at sometime during the academic year. The student may retake the test three times.

If necessary, a waiver may be granted to the few who attain the required combined score of 950, but who are unable to achieve the required math or verbal minimum scores.

Statement of the Problem

The BOOST Overview states, "Selection to BOOST is based on the results of the Scholastic Aptitude Test (SAT) and previous high school scores." Mayhue (1987) pointed out how difficult it is to compare high school grade point averages from around the country because there are so many unknowns in high school curricula and level of difficulty. Therefore, SAT scores are relied upon heavily by the selection board.

The purpose of this study is to determine if SAT scores indicate a predictive validity for BOOST

students' successful completion of BOOST. This study will include those students who were disenrolled for academic reasons to determine if a relationship exists between their pre-admittance SAT score and their disenrollment. This study will not focus on those students who were disenrolled for "other than" academic reasons.

Research Questions

The following research questions were formulated for this study.

1. What is the relationship between the Pre-admittance total SAT score (math and verbal combined) and successful completion of BOOST?

2. What is the relationship between the Pre-admittance SAT Math score and successful completion of BOOST?

3. What is the relationship between the Pre-admittance SAT Verbal score and successful completion of BOOST?

Scope and Focus

This paper is not intended to be a discussion of the many other factors which influence a BOOST candidate's success such as financial difficulties, parental expectations, and whether or not a student is married (Henderson, 1987). Motivation, personality, dedication, drive, and how one deals with adversity are directly related to performance at BOOST (Ahlborn, 1987), but are beyond the scope of this paper.

Selection criteria other than the Scholastic Aptitude Test will not be examined in depth. However, it must be acknowledged that alternative indicators such as high school grade point average, class rank, extracurricular activities, and interest inventories may be considered by admissions officers for BOOST. The American College Test (ACT) is sometimes used as a substitute for the SAT although this instrument is designed to measure different characteristics. The SAT measures aptitude while the ACT assesses skills and knowledge in four areas: math, English, science and social science (Hunt, 1988). The ACT will not be examined in this paper.

Although there are many interesting topics for which further study is needed, the intent of this paper is to focus on SAT scores as a predictor of successful completion of BOOST.

Significance of the Study

By determining whether or not there is a statistically significant relationship between SAT scores and students' successful completion of BOOST, the BOOST selection board will be able to more accurately predict prospective selectee's potential for successful completion of BOOST.

If there is no relationship between SAT scores and successful completion of BOOST, the minimum SAT scores required for selection to BOOST may be lowered. Or, if there is a statistically significant relationship between SAT scores and successful completion, the minimum SAT scores required for selection to BOOST may be raised, to help ensure successful completion of BOOST selectees.

Assumptions

For the purpose of this study, it is assumed that the participants put forth their best effort when taking the pre-admittance Scholastic Aptitude Test.

Definition of Terms

For the purpose of this study, the following terms are defined as follows:

1. American College Test (ACT): An instrument used by American colleges and universities as an alternative to the Scholastic Aptitude Test (SAT) to assist in the selection of prospective students. The ACT consists of four parts: math, English, science, and social science. Composite scores range from 1-36.

2. Broadened Opportunity for Officer Selection and Training (BOOST): An Affirmative Action program implemented in 1969 by the Chief of Naval Operations to provide scholastic skills and academic credentials to enhance the academic potential of personnel who may eventually become commissioned officers.

3. Commissioned Officer: A member of the armed forces who has received a commission from the President of the United States. Commissioned status generally requires a baccalaureate degree. BOOST is designed to provide a junior enlisted person, age 18-23, with academic remediation to enable successful completion of a baccalaureate degree and commissioning.(Ahlborn,1988)

4. Enlisted Person: A member of the armed forces who has made a commitment to serve for a specified period of time as stated in the enlistment contract.

5. Naval Reserve Officers Training Corps (NROTC): A program that prepares college students for a commission in the United States Navy or the United States Marine Corps.

6. Pre-admittance Scholastic Aptitude Test (SAT): The SAT score submitted to the BOOST selection board by a prospective BOOST applicant. The required, combined SAT minimum score is 850, waiverable to 750. Math minimum score is 460, Verbal score is 390.

7. Scholastic Aptitude Test (SAT): An instrument used by many American colleges and universities, as an indicator of developed aptitude, to assist in the selection of prospective students. The SAT consists of

two parts: math, and verbal, with a possible score of 200-800 each. The highest possible score is 1600.

8. Successful completion of a BOOST student: There are two requirements for successful completion of BOOST. First, the student must graduate with a 2.5 grade point average, on a 4.0 scale. Remediation and counseling are provided to assist the student in attaining that goal. Academic Review Boards are held to provide guidance and direction if necessary. The second requirement is that the student must have attained a minimum combined SAT score of 950, (normally consisting of a math score of 500, and a verbal score of 450), during the BOOST academic year. A BOOST student is given the opportunity to re-take the SAT three times during the academic year to achieve the required combined score of 950 which will ensure academic competitiveness in NROTC or the Naval Academy.

9. Track I BOOST student: Enlisted personnel who have served active duty time in the fleet and who were selected on the basis of performance. Track I runs twelve months from June until June the following year.

10. Track II BOOST student: Civilian personnel who were recruited and enlisted into the Navy

specifically to enroll in BOOST. Prior to attendance at BOOST, the only active duty time served is the eight week Basic Training program. Track II runs nine months from September to the following June.

Delimitations

This study is based on the following delimitations.

1. This study was limited to students enrolled in the Broadened Opportunity for Officer Selection and Training (BOOST) Program during the academic year 1987-1988.

2. United States Marine Corps BOOST students are selected on criteria other than SAT scores. Therefore, this study is limited to United States Navy BOOST students.

3. The data were limited to those available in the BOOST Administration personnel records.

4. The SAT score used in this study is the pre-admittance SAT score required of all BOOST applicants, reported within one year prior to enrollment.

5. Only pure pre-admittance SAT scores were included. When an identifiable ACT score was converted to an SAT score, for consideration by the BOOST selection board, it was deleted from the study. SAT conversions were not identifiable in the Track II population. Therefore, all Track II scores were eliminated from this study.

6. No attempt was made at sampling other populations to establish external validity necessary for generalization of findings to other institutions or populations.

Theory Base

Colleges, universities, and programs such as BOOST are faced with the difficult task of selecting qualified students from their many applicants. Traditionally subjective criteria including high school transcripts, letters of recommendation, and student essays are used in tandem with standardized test results to aid in selection. One standardized test used by many admissions officers is the College Entrance Examination Board's Scholastic Aptitude Test

(SAT.) Designed to provide objective information about a student's abilities, the SAT score is computed, "to be comparable across different forms of the tests and across different groups of test takers." (Mitchell, 1985, p.361) SATs are designed and constructed for selection purposes (Hanson & Schultz, 1986). Because of the difficulty of comparing high school grade point averages, the SAT is used at many colleges and universities as well as at BOOST.

Schwarz (1971) stated, "Unlike scores on a standard achievement test, the letter grades awarded by different institutions seldom reflect comparable levels of student attainment." (p. 309) Butler and McCauley (1987) found a direct relationship between high school rank as a predictor of grade point average with no decline in the validity of SAT scores. A review of the literature shows, "College admissions officers find SAT scores useful because they are fairly accurate in predicting whether the test-takers will do well academically during their freshman year in college." (Woodring, 1987, p. B2)

Like other academic programs, the goal of the BOOST selection board is to weigh the subjective and

objective application criteria to determine who should be admitted. The use of SAT scores, as one selection tool, ensures a consistent "rule of thumb" against which applicants to the BOOST program can be measured.

One purpose of this study is to determine if the minimum SAT scores used for selection to BOOST are valid. By using regression analysis, it will be determined whether or not these scores are accurate predictors of successful completion for the target population.

Organizational Design

This research report consists of five chapters. Chapter I contains the Introduction, Statement of the Problem, Research Questions, Scope and Focus, Significance of the Study, Assumptions, Definition of Terms, Delimitations, Theory Base, and Organizational Design.

Chapter II provides an overview of the related literature and the rationale for the present study. The areas of primary concern are the SAT as a predictor of performance, factors that influence the SAT score,

and research dealing with the SAT as it relates to minority students.

Chapter III presents the methodology employed in this study. The SAT as an instrument, including its reliability and validity is discussed. The BOOST student sample is described. The research and statistical analysis procedures are delineated.

Chapter IV contains the results of the research effort. Findings are provided in three tables. An analysis of the findings is described.

Chapter V includes a summary of the findings, conclusions, and recommendations.

CHAPTER II

REVIEW OF THE LITERATURE

Historical Background

The value of the Scholastic Aptitude Test (SAT) as a predictor of performance is a controversial issue. Throughout recorded time, it appears that where tests existed, criticism existed. "Criticism of tests is not new. It must have existed in ancient China, where positions of prestige and power were largely reserved to those who could pass rigorous tests of classical scholarship. It did indeed exist in the medieval universities, whose oral examiners did not always ask relevant questions nor judge answers fairly. It existed in Massachusetts in 1845, where Horace Mann insisted that written tests be used to assess the effectiveness of instruction. It existed throughout this country in the 1920s, when objective tests began to gain favor. It surrounded the development of state testing programs and the current activity in assessment. And, clearly, it is with us today."

(Ebel, 1975, p. 83)

Strenta and Elliott (1987) stated that, "Standardized selection tests for admission to colleges and universities are under heavy attack, and questions of their validity and utility continue to be timely..." (p. 281)

Cole (1987) wrote, "Several colleges have questioned the validity of the entrance exams as instruments for selection. After a two-year study, Bowdoin College discovered that only 31 per cent of its honors graduates had scored above the class average on both the SATs, while 24 per cent had scored below." (p. 128)

Another example cited by Cole (1987), "Williams College conducted a 10-year experiment of admitting 10 per cent of each year's class, who would otherwise have been rejected due to their scores. The identities of the students were kept confidential and they were subjected to the same academic curricula as the other students without any special aid. The findings of the study revealed that 72 per cent of the students had graduated compared to Williams' average of 85 per cent; in one graduating class, the class president, president

of the college council, and president of the honor society, had all been admitted under the special program." (p. 128)

The SAT as a Predictor

Woodring (1987) wrote, "The SAT is not designed to measure the subject matter learned in elementary and secondary school. It is designed to predict high school students' success in college, by measuring their ability to comprehend and use the kinds of verbal and mathematical symbols found in college textbooks, lectures and examinations. To score well, a student must know elementary algebra and geometry, understand the basics of English grammar and sentence construction, and have a good vocabulary" (p. B2).

Strenta and Elliott (1987) performed an in-depth study correlating SAT scores with rank-in-class data. They compensated for differences in curricula difficulty but still found that the SAT was a powerful predictor, "to adduce increasingly available data showing that well-constructed ability tests do not underpredict the academic performance of minority

groups...compared with local rank-in-class data,...the typical correlation of about .40 between SAT scores and grade point average (GPA) represents substantial predictive validity" (p. 281). They concluded, "Because of differential grading, the SAT appears to be less valid than it is" (p. 290).

Brounstein and Holahan (1987) stated, "math and verbal scale subscores (SATM and SATV, respectively) are predictive of success in college, adding significantly to the statistical prediction of first-year grades even after the effects attributable to high school rank and grade-point averages have been taken into account. Further, the predictive value of SAT scores to cumulative GPA over four years of college continues to be robust..." (p. 110).

"SAT scores are predictors of the test-takers' academic success in college. As such, they are an admissions tool, nothing more" (Woodring, p. B3).

Thurmond and Lewis (1986) reported that their study, "confirms findings of other studies and supports the present authors' assumptions that standardized measures of cognitive performance in high school can be used to predict performance..." (p. 642)

Factors that Influence the SAT

State by state average SAT scores vary greatly based on composition of those tested by sex, race and average family income. The article, Students from Most Minority Groups Improve Scores on College Admission Tests this Year; Averages Stable (1987), indicated that states vary from a low of 3 per cent of eligible students participating in the SAT to a high of 66 per cent, with a national average of 38 per cent. It is therefore difficult to make direct comparisons of average SAT scores by state (p. A34).

Woodring (1987) stated, "SAT scores tell us very little about the talents of average high school students because, in many states, average students do not take the test. The students who take it--a self-selected minority of about one-fourth of the college-age group--are the ones who hope to be admitted to a college that requires the SAT. In states where failure to gain admission to an Ivy League college is considered by many students to be a fate worse than death, more than half of high school juniors take the SAT. But in states where most students prefer either a

state university or church-related college, very few take it. The fact that SAT scores in Connecticut average only 912 while those in Iowa average 1089 tells us little or nothing about the quality of education in the two states, because 69 per cent of high school juniors in Connecticut take the test while only 3 per cent of those in Iowa do" (p. B2).

An interesting study was done by Behrendt, Eisenach, and Johnson (1986) which employed multiple regression analysis "to determine the effects of educational resources and population characteristics on mean SAT scores in each state." (p. 363) It was determined that the three most influential factors on mean SAT scores were: 1) the number of siblings a child has, 2) the number of college-educated people living in the state, and 3) the number of female headed households. (p. 368)

The average number of siblings a child has is directly related to mean SAT scores nationally. The higher number of siblings, the lower the mean SAT score. It was determined that "reducing the number of siblings by one person...would increase SAT scores by almost 80 points." (p. 368) The fact that adults of

the household are limited in the amount of time spent with each child negatively impacts the mean SAT score. (p. 364)

The greater the number of female headed households also directly negatively impacted the mean SAT score by nine points for the same reason. The female head of the house is "able to devote less attention to each child than two-parent households." (p. 364)

The "rise in the college educated fraction of the population" increased the mean SAT score by 22 points. (p. 368)

Behrendt, Eisenach, and Johnson (1986) also noted, "We were surprised that neither income nor race affected SAT scores in contrast to some previous studies." (p. 368) They determined that the demographic conditions cited above such as "larger families, fewer college-educated parents, and more female-headed families" were the true variables impacting mean SAT scores.

"Family crises, difficult social adjustments, uncorrected vision problems, personality clashes with one or more teachers, and many other factors...can and do attenuate the value of school achievement as a

predictor...Tests that are 'fair' to every applicant do not exist." (Schwarz, 1971, p.307)

The issue of cultural background influencing test scores is undeniable. "There is ample data indicating that the cultural content of a question can alter students' scores. Questions from recent SATs require students to be familiar with such activities as polo, golfing, tennis, minuets, pirouettes, property taxes, violins, melodeons and horseback riding. Students without this culturally-specific knowledge cannot obtain the high SAT scores needed to enter America's selective colleges..." (Weiss, 1987, p. 116)

Test makers continue to identify and delete test items which discriminate based on cultural background. According to the article, Students from Most Minority Groups Improve Scores on College Admission Tests this Year; Averages Stable (1987), "Some of the most egregious items have been eliminated from their tests. We believe this is a large reason for the increase in minority scores." (p. A34)

"Over the two-year period (from 1985 to 1987), the scores of black students increased by five points on the verbal section of the test to 351, and by one point

on the mathematics section, to 377." (p. A1)

An increase in SAT scores can indicate that the test takers became more proficient at test taking, rather than that their knowledge level increased (Steelman & Powell, 1985). Brounstein and Holahan (1987) also noted, "Students who retake the SAT generally show a linear trend of improvement, with scores increasing as students advance through school."

In 1976, "the National NAACP convened a Conference On Minority Testing which brought together educators, test producers, and civil rights leaders...Based on the recommendations of that report and the findings of the Stroud analysis, the NAACP appointed an advisory group of psychometricians to design test preparation workshops for low-income black students since their scores were by far the lowest on the SAT." (Cole, 1987, p. 132)

Following 14 sessions of test preparation workshops, the students' average SAT scores increased. "Statistically, significant and important gains were found...These average gains ranged from 24 to 49 points..." (Cole, 1987, p. 134)

BOOST Focus

The article, "Students from Most Minority Groups Improve Scores on College-Admission Tests this Year; Averages Stable," delineates average SAT scores by sex and race of the BOOST target pool, see Figure 1.

A minimum combined score of 850 is required for selection to BOOST--460 in mathematics and 390 in verbal. It is apparent from Figure 1 that minority students who are selected for BOOST have above average SAT scores.

BOOST students strive to attain an SAT score of 950--500 in mathematics and 450 in verbal, which is the minimum SAT score required for an NROTC scholarship. The national average to receive an NROTC scholarship is 1260, see Figure 2 (Henderson, 1987).

Because the SAT national average to receive an NROTC scholarship is 1260, and the minimum SAT score for acceptance to BOOST is 850, waiverable to 750, there are a significant number of applicants who appear overqualified for BOOST, but underqualified for NROTC.

SAT Averages by Sex and Race*

	Verbal Section	Math Section
Men	435	500
Women	425	453
American Indian	393	432
Asian	405	521
Black	351	377
Mexican American	379	424
Puerto Rican	360	400
Other Hispanic	387	432
White	447	489
Other	405	455
All	430	476

*1987 SAT scores

Adapted from the article, "Students from Most Minority Groups Improve Scores on College-Admission Tests this Year; Averages Stable" (1987)

Figure 1

These students who appear to have higher SAT scores than their BOOST counterparts failed to select for NROTC scholarships. The Navy's desire to support its Affirmative Action program and increase its number of minority officers produces a dilemma when the population BOOST is targeted for is not competitive enough to be selected for NROTC scholarships but also appear to be overqualified for BOOST, see Figure 3.

Theoretically, BOOST applicants, whose incoming SAT scores meet the minimum NROTC SAT requirement, were not selected to receive an NROTC scholarship because they were academically underprepared in high school. Often, these students lacked college prepatory guidance or access to college prepatory courses. NROTC and college entrance requirements include high school chemistry, physics, and/or trigonometry.

Therefore, the concern is, what can be done for the candidates who appear to have the qualifications necessary to succeed as a naval officer without violating the intent of the BOOST program to enhance the number of minority officers in the Navy?

Comparison of SAT Minimum Scores

	Combined Score	Math	Verbal
To Enter BOOST	*850	460	390
To Enter NROTC	950	500	450
To Enter Naval Academy	1120	600	520

*waiverable to 750

NROTC scholarship average SAT score is 1260

Naval Academy average upon entry is 1241

(Henderson, 1987, and Jackson, 1988)

Figure 2

Summary of Track I and Track II Ethnic Group SAT Scores

Class 87-88

Track I Scores	*SAT Average Incoming
Caucasians	1037
Blacks	900
Hispanics	981
Others	973
Females	903
Over-all combined	959
Track II	
Caucasians	999
Blacks	969
Hispanics	994
Others	962
Females	1063
Over-all combined	997
Over-all combined minus Females	981

*A total score of 1600 is the maximum possible score (Henderson, 1987)

Figure 3

The Caucasian race seems to skew the SAT scores to a higher average since the demand for the BOOST program is great, and Caucasians are limited to 30 per cent. Those Caucasians who are selected will have very high SAT scores relative to their BOOST counterparts.

Summary

It is evident that a great deal of controversy surrounds the use of the Scholastic Aptitude Test as a predictor of performance, whether at colleges, universities, or at BOOST.

The need for a tool to assist in the selection of prospective students is valid. Factors such as high school grade point average, rank in class, and the score of a standardized test are commonly used to assist admissions officers in the selection process.

Universities and colleges are increasingly recognizing the importance of giving equal consideration to factors such as class rank and grade point average while efforts continue to make the SAT more fair. Until a better system is devised, it appears that the current system will be maintained.

There is evidence that BOOST appears to be working. According to Buzby (1988), "In 1988, more than 80 per cent of the 1984 BOOST graduating class graduated from the college of their choice and were commissioned."

CHAPTER III

METHODOLOGY

Introduction

The purpose of this paper is to report the results of a study of BOOST pre-admittance SAT scores and their relationship to successful completion of BOOST. By determining whether or not there is a statistically significant relationship between the SAT scores used by the BOOST selection board, and students' successful completion of BOOST, the selection board will be able to more accurately predict the potential for successful completion of prospective BOOST candidates.

Selection criteria other than the Scholastic Aptitude Test (SAT) were not examined in this study. An American College Test (ACT) score is sometimes converted to an SAT score for review by the BOOST Selection Board (Jackson, 1989). It was impossible to identify raw pre-admittance SAT scores of Track II personnel (Sanchez, 1989). Therefore, all TRACK II scores were deleted from this study. Alternative

indicators including high school grade point average, class rank, extracurricular activities, fleet performance, and interest inventories are considered by BOOST admissions officers, but are beyond the scope of this paper.

Research Questions

The following research questions were formulated for this study.

1. What is the relationship between the Pre-admittance total SAT score (Math and Verbal Combined) and successful completion of BOOST?

2. What is the relationship between the pre-admittance SAT Math score and successful completion of BOOST?

3. What is the relationship between the pre-admittance SAT Verbal score and successful completion of BOOST?

Instrumentation

The instrument used in this study was the College Entrance Examination Board's Scholastic Aptitude Test (SAT), administered seven times annually by The College Board and Educational Testing Service. Rigorous instructions to be followed explicitly are detailed in the Admissions Testing Program Guide. All students throughout the nation are tested under the same conditions. The three hour test is administered on the same day, at the same time (relative to each time zone), at more than 3,800 testing sites. (Mitchell, 1985, p. 360)

"Each form of the SAT consists of six equal sections of thirty minutes duration: two are verbal, two are mathematical; one is the Test of Standard Written English, and one is reserved for research...to determine their psychometric characteristics and their overall utility for future tests, and for conducting other research...For all intents and purposes, efforts to make all forms of the SAT parallel succeed by adherence to well defined test specifications that include the distribution of item content, the

distribution of item difficulties, and the average of item-test correlations." (p.361)

The reliability of SAT scores is based on an "internal consistency estimation, using an adaptation (Dressel, 1940) of the familiar Kuder-Richardson 20 for use with formula scores. Typical internal consistency reliability coefficients exceed .90. Test-retest correlations average approximately .87 for both the mathematical and verbal sections." (p.361) SAT validity is demonstrated by the Validity Study Service which examines how well "SAT scores correlate with such external criteria as college grades and other predictors in admissions." (p.361) More than 3,500 studies at 750 colleges have been conducted. These studies confirmed high validity for the SAT.

Sample

This research study focused on the BOOST class of the 1987-1988 academic year. Data were gathered from the BOOST administration records. BOOST student characteristics include 70% minority, 10% women, ages 18-23 years old. Track I consists of students who have

served active duty time in the fleet; Track II consists of students who were recruited specifically to enter BOOST. This study was limited to Track I students with identifiable raw pre-admittance SAT scores.

The 1987-1988 academic year class began with 152 Track I students. A total of 40 students' SAT scores which did not meet the defined criteria were deleted from the study. The number of SAT scores converted from ACT scores was 35. The number of personnel dropped from BOOST for "other than" academic reasons was four. One United States Marine Corps student was enrolled in Track I. Total Track I personnel included in the study numbered 112, including 18 students dropped for academic reasons. Academic disenrollments were considered to determine if there was a predictive validity of the pre-admittance SAT score and successful completion of BOOST.

Procedure

A list of the academic year 1987-1988 Track I BOOST selectee's pre-admittance SAT scores was compared with a list of those who graduated. Names, social

security numbers, and pre-admittance Verbal, Math, and Combined SAT scores were checked for accuracy. A list providing the names, social security numbers, and reason codes of all students dropped from BOOST during the academic year 1987-1988, was compared to the master list. The reason code was annotated onto the master list. Through a process of elimination, students who were dropped for "other than" academic reasons, Marine Corps students who did not have SAT scores, and students who submitted an ACT score to the BOOST selection board were deleted from the data. One hundred twelve sets of data were included in the study.

The data were entered in columnar format, onto a 5 1/4 inch mini-floppy disk via a micro-computer, using the WordPerfect word processing software program. (see Appendix A) The four columns listed SAT pre-admittance Verbal, Math, and Combined scores, followed by a 1 indicating successful completion of BOOST, or a 2 indicating failure (academic drop). No attempt was made to identify the individual sets of data by name or social security number, as this information had no effect on the outcome of the data analysis. The data were then arranged into ASCII format to facilitate data

manipulation. Verification was performed manually, a minimum of three times, to ensure accuracy.

Statistical Analysis

Correlational research was employed ex post facto (Campbell & Stanley, 1963, p.70) to determine if a statistically significant relationship existed between successful completion of BOOST and the pre-admittance Math, Verbal, and Combined SAT scores used by the BOOST selection board for BOOST students during the academic year 1987-1988. The predictor variables were defined as the Math, Verbal, and Combined pre-admittance SAT scores. The dependent criterion was the variable predicted--successful completion of BOOST.

Stepwise regression analysis with a significance level of .001 (Hwang, 1989) was employed using the software Statistical Package for the Social Sciences to compute a correlation coefficient (Gay, 1987, p. 237) on a micro-computer.

Summary

The Math, Verbal, and Combined pre-admittance SAT scores of 112 selected Track I BOOST candidates of the academic year 1987-1988 were compared to successful completion of BOOST. Through the use of multiple regression analysis, the goal was to determine if there was a statistically significant predictive validity of the three predictor variables for successful completion of BOOST, the dependent criterion.

CHAPTER IV

RESULTS

Introduction

Correlational research was employed ex post facto to calculate if there was a statistically significant predictive validity of the Math, Verbal, and Combined pre-admittance SAT scores submitted to the BOOST selection board for the academic year 1987-1988. The goal was to utilize regression analysis to determine if the likelihood of successful completion of BOOST was related to the pre-admittance SAT scores. One hundred twelve sets of data consisting of the Math, Verbal, and Combined pre-admittance SAT scores of Track I BOOST students were selected and compared with successful or unsuccessful completion of BOOST.

Stepwise regression analysis with a significance level of .001 (Hwang, 1989) was employed using the Statistical Package for the Social Sciences to compute three correlation coefficients (Gay, 1987, p. 237) on a micro-computer.

Findings

The first research question was, "What is the relationship between the pre-admittance total SAT score (Math and Verbal Combined) and successful completion of BOOST?"

Relationship of Combined SAT Score
to Successful Completion:

Variable	Correlation Coefficient
Combined SAT scores	.3696*

N=112

*Significant at the .001 level

Table 1.

The second research question was, "What is the relationship between the pre-admittance SAT Math score and successful completion of BOOST?"

Relationship of Math SAT Score
to Successful Completion:

Variable	Correlation Coefficient
Math SAT score	.3871*

N=112

*Significant at the .001 level

Table 2.

The third research question was, "What is the relationship between the pre-admittance SAT Verbal score and successful completion of BOOST?"

Relationship of Verbal SAT Score
to Successful Completion:

Variable	Correlation Coefficient
Verbal SAT score	.1735

N=112

Table 3.

Analysis

The Combined Math and Verbal pre-admittance SAT score for Track I students of the academic year 1987-1988 produced a correlation coefficient of .3696 when compared to successful completion of BOOST. According to Gay (1987, p. 524), at the .001 significance level, with 112 sets of data, a correlation coefficient of .3696 indicated a statistically significant predictive validity of the Combined Math and Verbal pre-admittance SAT score for successful completion of BOOST.

The Math pre-admittance SAT score for Track I students of the academic year 1987-1988 produced a correlation coefficient of .3871 when compared to successful completion of BOOST. According to Gay (1987, p. 524), at the .001 significance level, with 112 sets of data, a correlation coefficient of .3871 indicated a statistically significant predictive validity of the Math pre-admittance SAT score for successful completion of BOOST.

The Verbal pre-admittance SAT score for Track I students of the academic year 1987-1988 produced a correlation coefficient of .1735 when compared to

successful completion of BOOST. According to Gay (1987, p. 524), at the .001 significance level, with 112 sets of data, a correlation coefficient of .1735 indicated no statistically significant predictive validity of the Verbal pre-admittance SAT score for successful completion of BOOST.

The Math pre-admittance SAT scores of 112 data sets of Track I BOOST personnel of the academic year 1987-1988 resulted in a statistically significant correlation coefficient of .3871 when compared to successful completion of BOOST. This correlation coefficient produced the greatest predictive validity of the three predictor variables according to the regression analysis. (See Appendix B) The pre-admittance Math SAT scores were significant at the .001 level.

The Combined Math and Verbal pre-admittance SAT scores of 112 data sets of Track I BOOST personnel of the academic year 1987-1988 resulted in a statistically significant correlation coefficient of .3696 when compared to successful completion of BOOST. This variable was not significant in the regression equation.

The Verbal pre-admittance SAT scores of 112 data sets of Track I BOOST personnel of the academic year 1987-1988 resulted in a correlation coefficient of .1735 when compared to successful completion of BOOST. This correlation coefficient indicated that there was no relationship between the Verbal pre-admittance SAT score and successful completion of BOOST. The Verbal pre-admittance SAT score indicated no predictive validity for successful completion of BOOST.

Summary

When 112 sets of data with three predictor variables were correlated to the criterion variable of successful completion of BOOST, it was determined that two of the three variables provided statistically significant predictive validity of successful completion of BOOST at the significance level of .001. The predictor variables were defined as the Combined Math and Verbal, the Math, and the Verbal pre-admittance SAT scores. The Verbal pre-admittance SAT score indicated no relationship to successful completion of BOOST. The Combined Math and Verbal pre-

admittance SAT score and the Math pre-admittance SAT score were statistically significant predictors of successful completion of BOOST for Track I students during the 1987-1988 academic year. The regression analysis showed that the Math pre-admittance SAT scores were significant at the .001 level.

the Verbal pre-admittance SAT scores which were submitted to the BOOST selection board for the academic year 1987-1988. The criterion variable was defined as successful completion of BOOST. Eighteen of the 112 students were dropped for academic reasons. This information was included in the study to determine if the pre-admittance SAT scores revealed a predictive validity for successful completion of BOOST.

Two of the three predictor variables were determined to provide a predictive validity for successful completion of BOOST. The Combined Math and Verbal (r=.3696) pre-admittance SAT score, and the Math (r=.3871) pre-admittance SAT score reflected statistically significant predictive validity at a .001 significance level. The Verbal (r=.1735) pre-admittance SAT score showed no relationship to successful completion of BOOST.

Conclusions

The findings of this study supported the dichotomy evident in the review of the literature. Two of the three criterion variables indicated a statistically

significant predictive validity for successful completion of Track I BOOST students. The Combined Math and Verbal pre-admittance SAT scores, and the Math pre-admittance SAT scores showed a significant correlation coefficient at the .001 level. The Verbal pre-admittance SAT score did not.

Although the research indicated a statistically significant predictive validity of the correlation coefficients for the Combined Math and Verbal pre-admittance SAT score, and the Math pre-admittance SAT score, it must be noted that these correlation coefficients (r=.3696 and r=.3871, respectively) are low. The confidence level for predictability of these coefficients is extremely low and, therefore, must be interpreted with caution.

Recommendations

1. The BOOST selection board should continue to use other criteria for selecting students for the BOOST program. Currently, the BOOST selection board examines high school grade point average, rank in class, extracurricular activities, past performance in the

fleet, and interest inventories. This procedure is reflective of colleges and universities, and is supported by this research.

2. Other researchers should replicate this study with other academic year groups.

3. Other researchers should conduct a study using other variables such as gender, ethnic background and age to determine their relationship to SAT scores and successful completion of BOOST.

4. BOOST administrators could implement a procedure for the identification of raw pre-admittance SAT and ACT scores. For example, using a last digit "5" to indicate a score that was converted from ACT to SAT for submission to the BOOST selection board. (Jackson, 1989)

5. BOOST personnel should recognize that students admitted to the BOOST program with low pre-admittance Math SAT scores may require additional instructional resources and remediation in order to increase their chances of successful completion. These additional services should be provided to these candidates.

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APPENDIX A

Columnar format of raw data:

Column 1= pre-admittance SAT Verbal score

Column 2= pre-admittance SAT Math score

Column 3= pre-admittance Combined Math and Verbal score

Column 4= pass/fail indicated

"1" denotes successful completion of BOOST

"2" denotes academic drop

430	490	920	2
550	500	1050	1
590	560	1150	1
370	430	800	1
450	540	990	2
540	560	1100	1
460	580	1040	1
420	570	990	1
410	510	920	1
370	530	900	2
520	480	1000	1
550	500	1050	1
600	480	1080	1
380	470	850	1
510	470	980	1
460	630	1090	1
360	560	920	1
350	400	750	2
400	520	920	1
520	650	1170	1
400	460	860	1
470	700	1170	1
530	570	1100	1

430	510	940	1
350	550	900	1
540	510	1050	1
410	560	970	1
510	430	940	1
390	530	920	1
450	530	980	1
500	580	1080	1
490	520	1010	1
410	470	880	1
500	670	1170	1
400	470	870	1
480	510	990	1
460	560	1020	1
350	510	860	1
410	490	900	1
550	490	1040	2
400	540	940	1
440	430	870	1
500	580	1080	1
550	590	1140	1
420	540	960	1
360	570	930	1

500	610	1110	1
410	470	880	1
480	500	980	2
440	640	1080	1
320	410	730	1
420	580	1000	1
480	470	950	1
460	570	1030	1
450	620	1070	1
490	500	990	1
430	590	1020	1
390	500	890	2
520	500	1020	1
520	500	1020	1
370	330	700	2
440	420	860	2
490	480	970	2
440	520	960	1
510	560	1070	1
420	550	970	1
450	450	900	2
400	520	920	1
580	540	1120	1

620	660	1280	1
490	590	1080	1
440	660	1100	1
440	480	920	1
430	550	980	1
450	610	1060	1
370	470	840	2
570	470	1040	1
420	570	990	1
450	460	910	1
440	530	970	1
540	490	1030	1
470	510	980	1
470	560	1030	1
410	400	810	2
380	470	850	2
420	530	950	1
470	530	1000	1
520	450	970	1
420	600	1020	1
510	460	970	1
470	580	1050	1
490	440	930	2

370	400	770	1
420	490	910	1
630	470	1100	1
420	480	900	1
390	540	930	1
360	560	920	1
480	460	940	2
400	470	870	1
520	490	1010	1
560	430	990	1
450	400	850	2
430	480	910	1
350	460	810	1
460	710	1170	1
470	640	1110	1
410	530	940	2
630	590	1220	1
490	670	1160	1
410	650	1060	1
550	510	1060	1

APPENDIX B

Multiple Regression Analysis indicating the pre-admittance Math SAT score as the significant predictor variable to the criterion variable successful completion of BOOST:

Variable	T	Sig T
Math	-4.404	.0000
Verbal	-1.218	.2259
Combined	-1.223	.2239

Thesis
B35865 Belec
c.1 The Scholastic Aptitude Test as a performance predictor of Broadened Opportunity for Officer Selection and Training (BOOST).